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| 10/665,304 | 09/18/2003 | Madapusi K. Keshavan | 49524/CM/M277 | 5445 |
| 23363 | 7590 | 08/24/2006 | EXAMINER | |
| CHRISTIE, PARKER & HALE, LLP | | | MAYES, MELVIN C | |
| PO BOX 7068 | | | ART UNIT | PAPER NUMBER |
| PASADENA, CA 91109-7068 | | | 1734 | |

DATE MAILED: 08/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/665,304

Applicant(s)

KESHAVAN ET AL.

Examiner

Melvin Curtis Mayes

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5-12 and 25-49 is/are pending in the application.
- 4a) Of the above claim(s) 40-49 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-12 and 25-39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

(1)

Newly submitted claims 40-49 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

Inventions of Claims 1-39 and Claims 40-49 are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the combination does not require determining shrinkage of the ultra hard material during sintering and the portion of the substrate to have a shrinkage similar to the determined shrinkage of the ultra hard material. The subcombination has separate utility such as to make other than a cutting element and sintering at other than full densification.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 40-49 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 112

(2)

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

(3)

Claims 1-3, 5-12 and 25-39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 25 claim density is selected “for reducing a constraint” or densities are chosen “to reduce a constraint...” It is not clear from the claims from what constraint the constraint is reduced. Is the reduction in shrinkage constraint in comparison to sintering the ultra hard material in contact with a fully densified substrate? Is the reduction in shrinkage constraint in comparison to sintering the ultra hard material in contact with a particular substrate material? The claims are not clear in that reducing is a relative term and it is not clear what this reduction is in comparison to.

Claim Rejections - 35 USC § 102 and 103

(4)

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

(5)

Claims 1, 7-12, 17-24 and 34-36 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Komanduri 4,797,138.

Komanduri discloses a method of making a cutting tool comprising: providing cemented carbide substrate of porosity of less than 15% by volume (at least 85% of full density); providing the substrate with at least one partition which divides the support surface of the substrate into at least two discrete support areas; filling the support areas with a layer of crystals of diamond or cubic boron nitride (ultra hard material); and heating under high pressure and high temperature to a temperature above the melting point of the cementing agent of the cemented carbide to bond the crystal together and to the substrate to produce a composite; and slicing through the partition to form cutting tools (col. 2-4).

Further, by providing crystals of diamond or cubic boron nitride for filling the support areas, an ultra hard material which is not fully densified is obviously provided, as claimed

Further, by providing a cemented carbide substrate of porosity of up to 15% by volume (i.e. less than full density), a substrate is selected which at least has a portion or its entirety of density that is less than 100% of full density, as claimed, such as within the ranges of 70-90%, 40-90% or 75-99% of full density as claimed in Claims 8-9 and 18-21 and within the range of 1-30% porosity, as claimed in Claims 11 and 22, which is a density selected which reduces the

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constraint provided by the substrate on the shrinkage of the ultra hard material during sintering as compared to sintering the ultra hard material on a fully densified substrate.

(6)

Claims 1-3, 5, 6, 8-12, 25-33 and 37-39 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Aronsson et al. 4,764,434.

Aronsson et al. disclose a method of making a diamond tool comprising: providing diamond powder; providing a support comprising a support body of cemented carbide and thin PVD or CVD applied coating of titanium nitride; placing the diamond powder (ultra hard material) on the coated surface; and sintering at high pressure and high temperature. The surface of the support body can be provided with depressions, recesses or grooves (col. 1-3).

Further, by providing the cemented carbide body as coated with a PVD or CVD applied coating of titanium nitride, a substrate having a portion (the coating) with a density less than 100% of full density and second portion (the cemented carbide body) that is different in density or fully densified is obviously provided, the coating obviously of a density which reduces the constraint provided by the substrate on the shrinkage of the ultra hard material during sintering as compared to sintering the ultra hard material on a fully densified substrate.

Further, providing the coating (portion of the substrate) as having a density or porosity in the ranges as claimed in Claims 8-11, 18-22 and 26-30 would have been obvious to one of ordinary skill in the art as the results of applying a coating of titanium nitride by PVD or CVD.

(7)

Claims 1-3, 6, 8-11, 25-30, 32, 33 and 37-39 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Burnand et al. 4,802,895.

Burnand et al. disclose a method of making a diamond abrasive compact comprising: providing diamond particles; providing a support comprising a cemented carbide body having a layer of carbide powder on its surface; placing a layer of diamond particles on the carbide powder layer; and applying high temperature/high pressure (col. 2).

Further, by providing the cemented carbide body as having a layer of carbide powder, a substrate having a portion (the powder layer) with a density less than 100% of full density and second portion (the cemented carbide body) that is different in density or fully densified is obviously provided, the layer of carbide powder obviously of a density which reduces the constraint provided by the substrate on the shrinkage of the ultra hard material during sintering as compared to sintering the ultra hard material on a fully densified substrate.

Further, providing the powder layer (portion of the substrate) as having a density or porosity in the ranges as claimed in Claims 8-11, 18-22 and 26-30 would have been obvious to one of ordinary skill in the art as the results of providing a layer of carbide powder.

(8)

Claims 1-3, 5, 6, 8-11, 25-30, 32, 33 and 37-39 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Hall et al. 4,604,106.

Hall et al. disclose a method of making a diamond compact such as for cutting (cutting element) comprising: providing a cemented tungsten carbide substrate coated with a mixture of

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precemented carbide and diamond crystals with cobalt binder material; placing a layer of diamond crystals against the mixture; and applying high temperature and pressure to bond the diamond crystals. Due to the mixture applied to the carbide substrate, residual stresses between the substrate and diamond are reduced (col. 5-8).

Further, by providing the cemented tungsten carbide substrate as coated with a mixtures of precemented carbide and diamond crystals to reduce residual stresses, a substrate having a portion (the coating) with a density less than 100% of full density and second portion (the cemented carbide substrate) that is different in density or fully densified is obviously provided, the coating obviously of a density which reduces the constraint provided by the substrate on the shrinkage of the ultra hard material during sintering as compared to sintering the ultra hard material on a fully densified substrate.

Further, providing the coating (portion of the substrate) as having a density or porosity in the ranges as claimed in Claims 8-11, 18-22 and 26-30 would have been obvious to one of ordinary skill in the art as the results of applying a coating of precemented carbide and diamond crystals.

(9)

Claims 1, 7 and 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vale et al. 6,779,951 in view of Bovenkerk et al. 4,311,490.

Vale et al. disclose a method of making a drill insert (cutting element) comprising: load a carbide mass 101 in a can bottom; loading polycrystalline diamond crystals 102 or precompacted tape of a superabrasive constituent on the carbide mass; applying high temperature and pressure

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sintering conditions to cause the metal binder in the carbide mass to promote sintering of the diamond crystals (col. 5, lines 16-44).

Bovenkerk et al. teach that a carbide mass for bonding to a mass of abrasive crystals such as diamond or cubic boron nitride in a high temperature/high pressure process may be provided a mass of carbide powder in admixture with a bonding metal which functions as a metal bond for sintering the carbide for making the sintered carbide support (col. 2, line 5 – col. 4, line 14).

It would have been obvious to one of ordinary skill in the art to have provided the carbide mass in the method of Vale et al. as a mass of carbide powder in admixture with the metal binder, as taught by Bovenkerk et al., as carbide mass used for bonding to abrasive crystals in a high temperature and pressure process. By providing the carbide mass as a mass of carbide powder in admixture with the metal binder, a substrate is selected which at least has a portion or its entirety of density that is less than 100% of full density, as claimed, the mass of powder obviously of a density which reduces the constraint provided by the substrate on the shrinkage of the ultra hard material during sintering as compared to sintering the ultra hard material on a fully densified substrate.

Response to Arguments

(10)

Applicant's arguments filed June 8, 2006 have been fully considered but they are not persuasive.

Applicant argues that the references do not disclose, teach or suggest selecting a density of a least a portion of a substrate for the purpose of reducing a constraint provided by the substrate to the ultra hard material shrinkage during sintering.

(11)

The references cited either disclose providing a substrate having porosity or being non-densified or providing a substrate with a coating which is not fully densified. Sintering ultra hard material on these substrates would obviously result in a reduction of shrinkage constraint of the ultra hard material during sintering compared to sintering ultra hard material on a fully densified substrate. The references disclose the same method as Applicant, that being to sinter ultra hard material with a substrate having at least a portion which is not fully densified, which provides reduced shrinkage constraint compared to sintering the material in contact with a fully dense substrate.

Conclusion

(12)

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

(13)


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melvin Curtis Mayes whose telephone number is 571-272-1234. The examiner can normally be reached on Mon-Fri 7:30 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chris Fiorilla can be reached on 571-272-1187. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

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like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Melvin Curtis Mayes
Primary Examiner
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MCM

August 21, 2006